IRRIGATION TECHNOLOGY 2018

Presented by:

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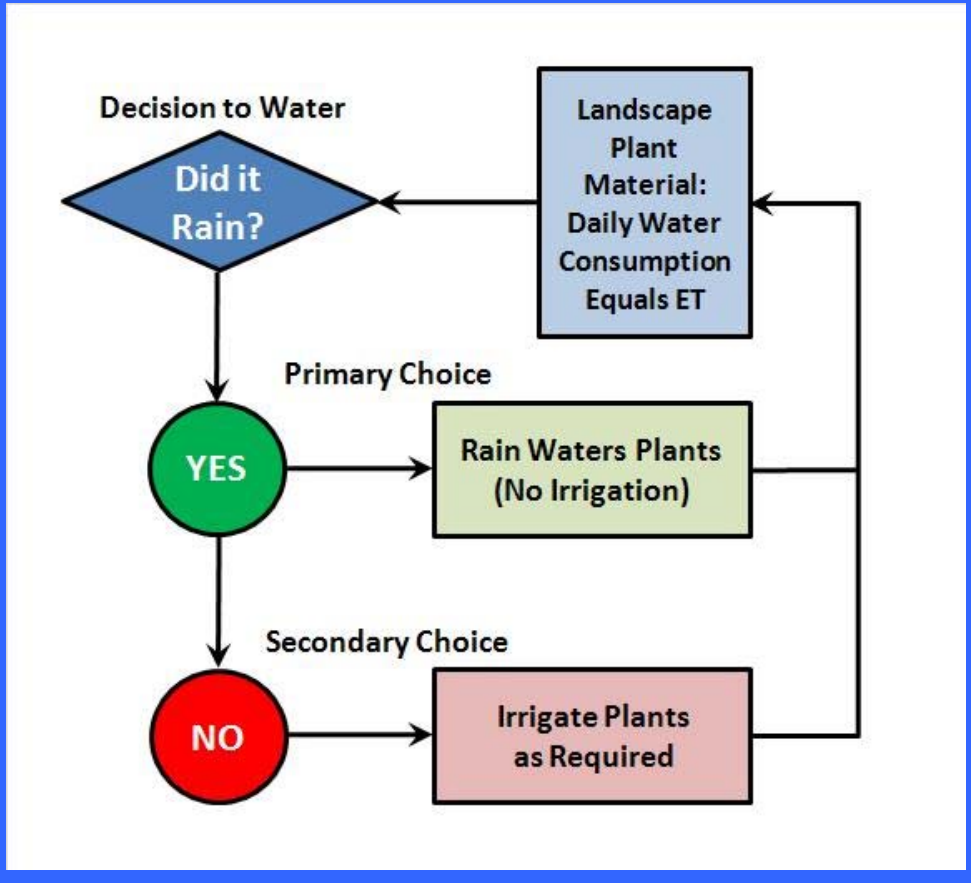
LEED AP, EIT, FASIC

CID, CIC, CLIA, CGIA, CLIM

ROLE OF IRRIGATION

- *In the east irrigation is a means of supplementing rainfall, not replacing it. In other parts of the country such as the southwest it is essential.*



IRRIGATION WATER USE

- In the United States, agricultural irrigation is by far the largest user of fresh water, using 79.6% of the total consumed in the country.
- Industry and power generation use another 8.5%.
- Domestic use - 4.3%
- Livestock operations 3.2%
- Golf courses use approximately 1.5%
- Landscape irrigation (except golf courses) consumes 2.9 % of the country's freshwater consumption

THE FACTS

- *Landscape Irrigation and Watering Competes for Its' Water Supply with:*
  - *Public Health*
  - *Fish*
  - *Wildlife*
  - *Navigation*
  - *Urban Sprawl*
  - *Recreation*
  - *Other Irrigation*
- *As a Result, Landscapes Need to Use Water as Efficiently as Possible*

SOIL INTAKE RATE

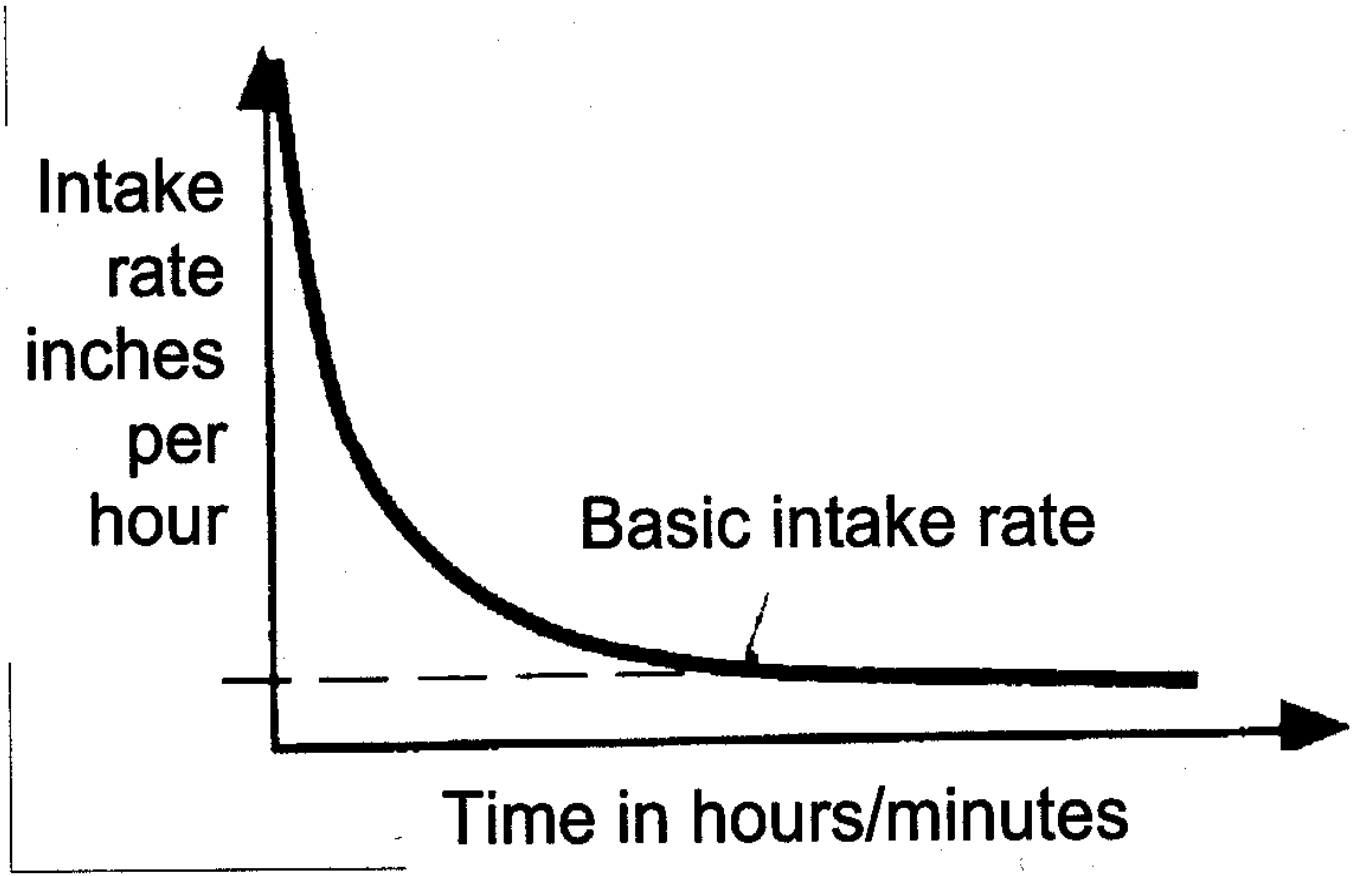
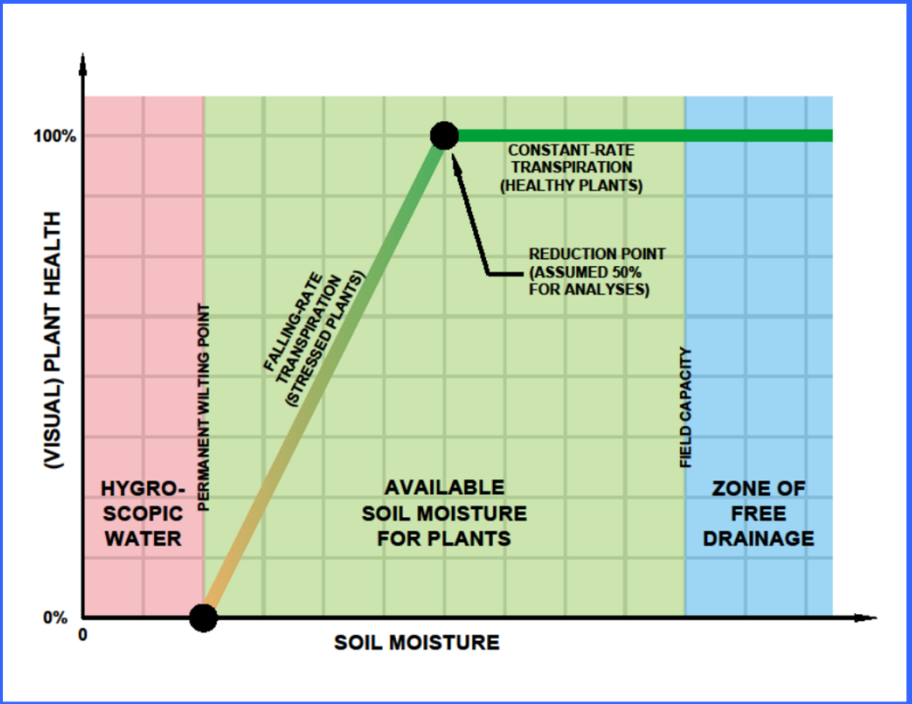


Figure 2-4: Typical shape of a soil intake-rate curve

SOCIETY

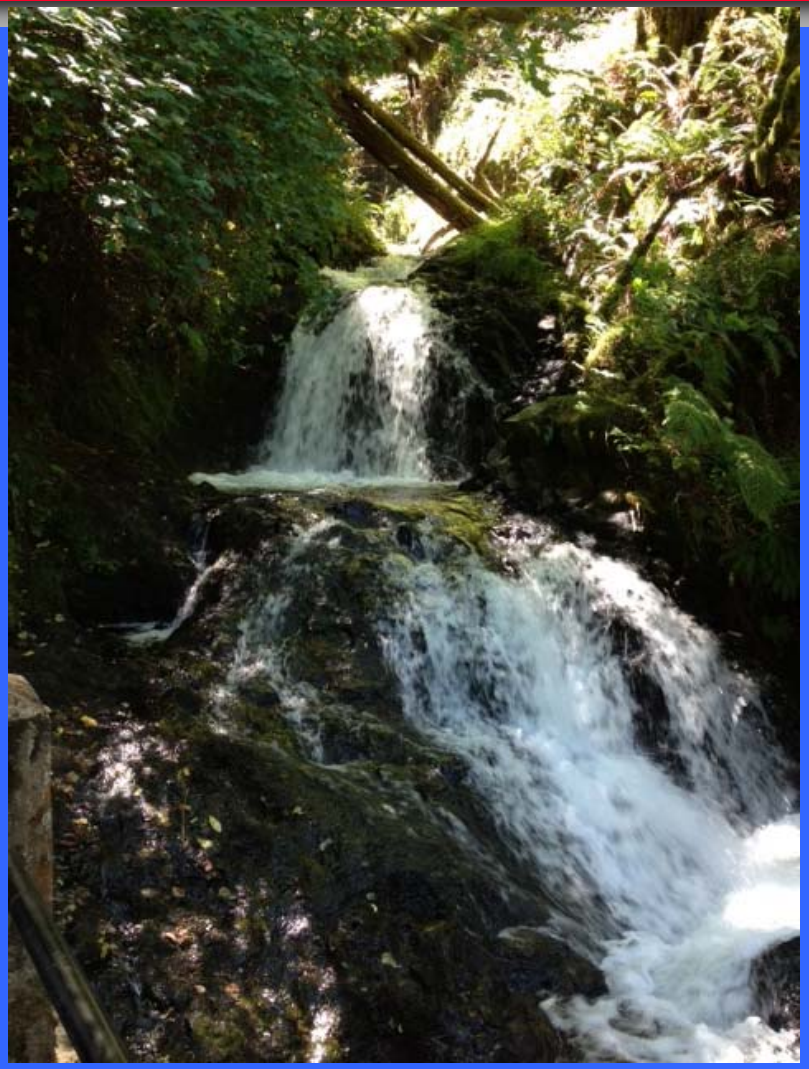
- *Architects and Designers decide how their landscapes are used by Society (Parks, Offices, Campuses, Retail Stores)*
- *Irrigation affects Society by the Level of Landscape Plant Health*
  - *Attractiveness*
  - *Usefulness*
  - *Hazard Prevention (Fires)*

Simple "Vulnerability Curve"



ENVIRONMENT

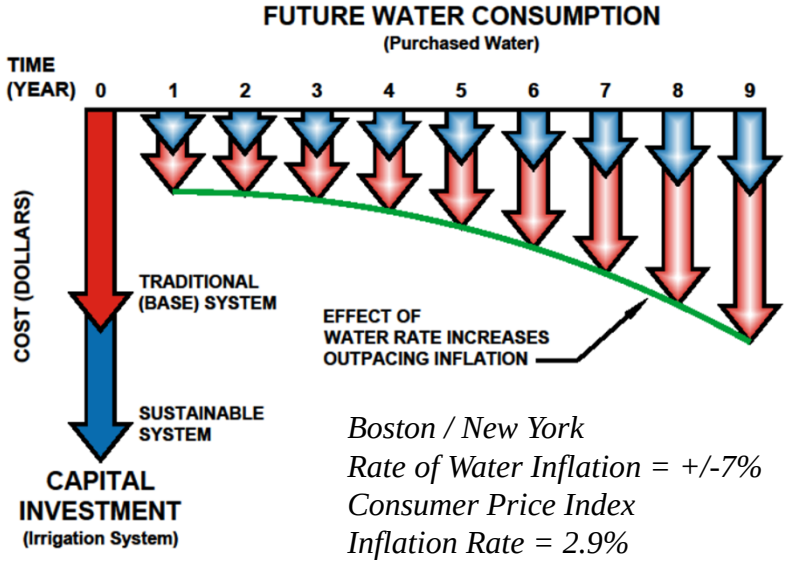
- *"Green" Projects are conscious of many Site-Specific Environmental Issues:*
  - *Storm Water*
  - *Erosion*
  - *Open Space*
  - *Heat-Island Effect*
- *Intent: Think Globally—Act Locally*
- *Irrigation Directly Influences Regional Environment by Drawing from Area Water Supplies and Levels Critical to Humans and Wildlife*
  - *Excessive Potable Use Equals Bad for the Environment*



ECONOMY

- *An Irrigation System must be Economically Viable NOW and in the FUTURE*
- *Cannot Simply Select Cheapest System—We Must Consider*
  - *Future Potable Water Costs*
  - *Future Electricity Costs*
  - *Future Maintenance Costs*
  - *RISK of LOSS*

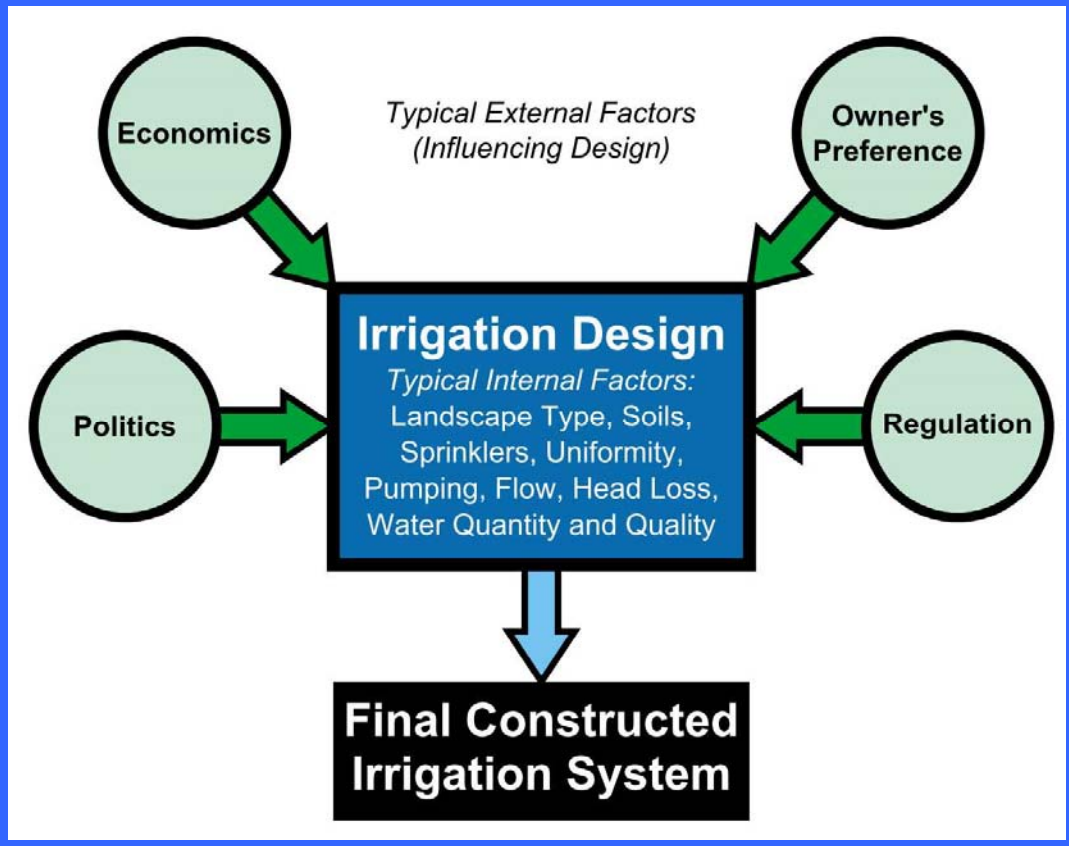
Sum of Arrows is "Present Value"



Boston / New York
Rate of Water Inflation = +/-7%
Consumer Price Index
Inflation Rate = 2.9%
Over 30 Year Period

CURRENT PRACTICES

- Irrigation Design Process with External Influence



IRRIGATION SYSTEMS OVERVIEW

TURF SPRAYS

- *Stationary Spray*
- *Small Areas*
  - *5 to 15 feet*
- *Landscape and Turf*
- *Low Pressure*
  - *30 psi*
- *Very High Precipitation Rates*
  - *1.5 to 2.0 inches/hour*
- *Being regulated out buy Green Code*

LANDSCAPE SPRAYS

MSMT (ROTATORS)

- *Rotating - Multiple Stream Multiple Trajectory*
- *Small Areas*
  - *8 to 30 feet*
- *Landscape and Turf*
- *Low Pressure*
  - *40/45 psi*
- *Medium Precipitation Rates*
  - *0.6 to 0.9 inches/hour*

SMALL/MEDIUM ROTORS

- *Single Rotating Stream*
- *Medium Sized Areas*
  - *18 to 45 feet*
- *Turf*
- *Medium Pressure*
  - *35 to 50 psi*
- *Low Precipitation Rates*
  - *0.2 to 0.45 inches/hour*

LARGE ROTORS

- *Single Rotating Stream*
- *Large Sized Areas*
  - *45 to 65 feet*
- *Turf*
- *High Pressure*
  - *50 to 70 psi*
- *Medium Precipitation Rates*
  - *0.40 to 0.65 inches/hour*

VERY LARGE ROTORS

- *Combined Single Rotating Stream*
- *Large Sized Areas*
  - *65 to 90 feet*
- *Turf*
- *High Pressure*
  - *65-90 psi*
- *Medium Precipitation Rates*
  - *0.45 to 0.65 inches/hour*

EXTREMELY LARGE ROTORS

- Combined Single Rotating Stream
- Large Sized Areas
  - 111 to 177 feet
- Synthetic Turf
- Very High Pressure
  - 60-115+ psi
- Flow
  - 114 to 303 gpm
- High Precipitation Rates

BUBBLERS

- *Flowing Stream*
- *Focused Water Application*
- *Trees and Large Shrubs*
- *Low Pressure (30 psi)*
- *0.25 to 2.0 gpm*
- *High Application Rate*
- *Drip More Applicable*

DRIP IRRIGATION

- *Various Emitter and Row Spacings*
- *Small, Medium and Large Sized Areas*
- *Plantings (Turf?)*
- *Medium Pressure*
  - *30 to 70 psi*
- *Precipitation Rates*
  - *0.5 to 2.0 inches/hour*

ELECTRIC VALVES

- *Turn Zones On/Off*
- *Electrically Actuated*
  - *24 volt AC*
- *Hydraulically Operated*
- *¾ -3 Inch*
- *150-220 psi rated*
- *Brass and Plastic*
- *May Isolate Before*
- *Manifold Together*

DRIP VALVES

- *Low Flows*
  - *Special Valves May Be Required*
- *Filters*
  - *140 or 200 Mesh*
  - *Must be Serviceable*
- *Pressure Regulation*
  - *45 psi*

CONTROLLERS

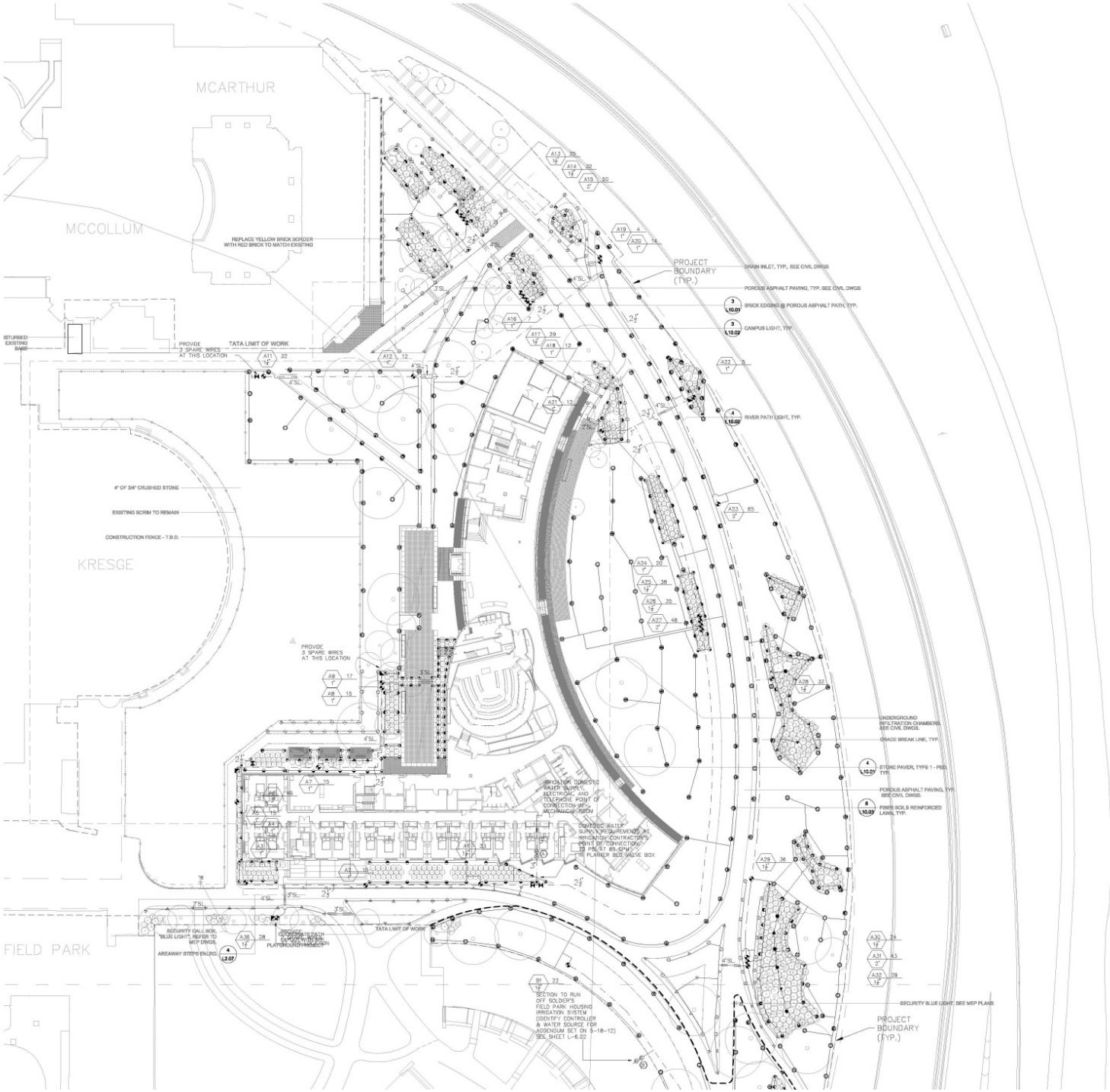
- *Operate Valves*
  - *Conventional 6-48 Zones*
- *Various Features*
- *Various Costs*

TWO-WIRE/DECODER

- *One-Wire*
  - *Two Cables*
  - *Up to 200 Zones*
- *Smart*
  - *Data vs. Signal*
- *Surge Protection*
  - *At set distance along the two-wire path*
- *Grounding*
  - *At each surge arrestor*
    - *Rod and plate*
    - *Plate*

RAIN SENSORS

- *Interrupt System Operation*
- *Can Be Set for a Minimum Amount of Rainfall*
- *Can Be Instantaneous*
- *Hard Wired or Wireless*
- *Location is the Key*



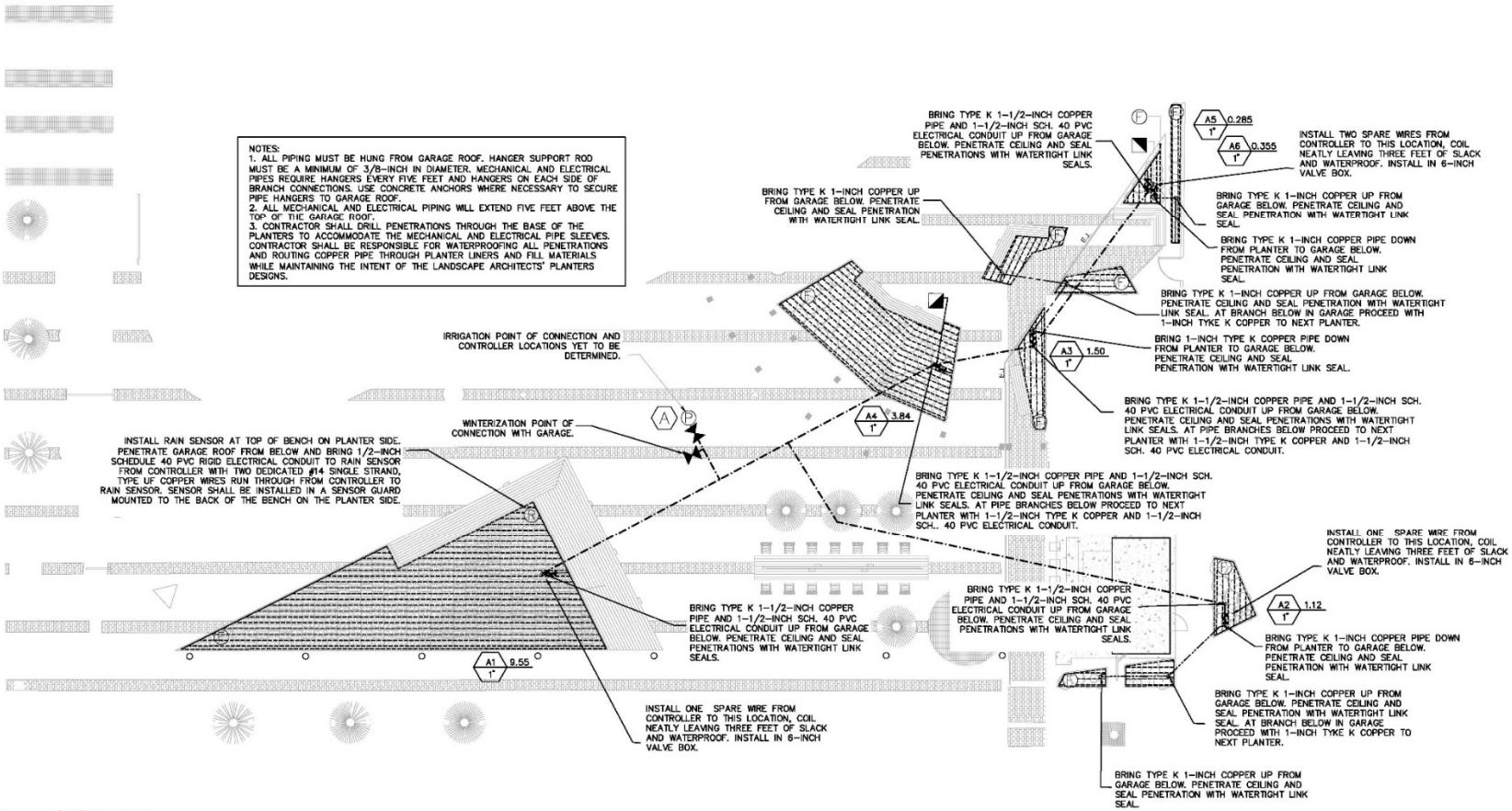
IRRIGATION LEGEND			
SYMBOL		DESCRIPTION	
	40	35'	MP3500 ROTARY NOZZLE ON 6-INCH SPRAY SPRINKLER
	40	25'	MP3000 ROTARY NOZZLE ON 6-INCH SPRAY SPRINKLER
	40	18'	MP2000 ROTARY NOZZLE ON 6-INCH SPRAY SPRINKLER
	40	12'	MP1000 ROTARY NOZZLE ON 6-INCH SPRAY SPRINKLER
	40	12'	MPCORNER ROTARY NOZZLE ON 6-INCH SPRAY SPRINKLER
S | R | TR | V | F			
	30	15'	6-INCH POP UP SPRAY SPRINKLER W/ CHECK VALVE AND PRESS. REG.
	30	12'	
	30	10'	
	30	8'	
	30	5'	
	30	9'x18'	
	30	4'x30'	
	30	4'x15'	
S | R | TR | V | F			
	30	15'	12-INCH POP UP SPRAY SPRINKLER W/ CHECK VALVE AND PRESS. REG.
	30	12'	
	30	10'	
	30	8'	
	30	5'	
	30	9'x18'	
	30	4'x30'	
	30	4'x15'	
		ISOLATION GATE VALVE (LINE SIZE)	
		1" QUICK COUPLING VALVE	
		24 VOLT ELECTRIC ZONE VALVE (SEE VALVE DESIGNATOR FOR FLOW AND SIZES)	
		24 VOLT ELECTRIC ZONE VALVE W/ DISK FILTER (DRIP) (SEE VALVE DESIGNATOR FOR FLOW AND SIZES)	
		AIR VACUUM RELIEF VALVE	
		AUTOMATIC FLUSHING VALVE	
		1-1/2 INCH CLASS-200 PVC MAINLINE PIPING	
		CLASS-160 PVC PIPE SLEEVE (SIZE AS INDICATED) INSTALL SCH-40 PVC WIRE CONDUIT ADJACENT TO ALL MAINLINE PIPE SLEEVES, MINIMUM WIRE CONDUIT SIZE TO BE 2-INCH, UNLESS OTHERWISE NOTED. SEE SLEEVING DETAIL.	
		AUTOMATIC RAIN SENSOR	
		24 STATION AUTOMATIC CONTROLLER	
		1-1/4" INCH IRRIGATION WATER METER (SEE PLUMBING DRAWINGS)	
		1-1/4" INCH REDUCED PRESSURE BACK FLOW PREVENTION DEVICE (SEE PLUMBING DRAWINGS)	

VALVE DESIGNATION:

IRRIGATION NOTES

0. SEE IRRIGATION DETAILS AND SPECIFICATIONS SECTION 328000 FOR ADDITIONAL REQUIRED INFORMATION.
1. COORDINATE FINAL LOCATION OF ALL SPRINKLERS AND NOZZLE SELECTION W/ FINAL APPROVED LANDSCAPE.
2. ALL PIPE AND VALVE LOCATIONS ARE DIAGRAMMATIC, CONTRACTOR SHALL FIELD VERIFY.
3. ALL VALVES AND VALVE BOXES SHALL BE PLACED, WHERE POSSIBLE, IN PLANTED AREAS UNDER MULCH.
4. INSTALL ALL PIPING AS FAR FROM TREES AND ROOT BALLS AS POSSIBLE WHILE MAINTAINING SPRINKLER SPACING.
5. ALL CONTROL WIRE SHALL BE #14 GAUGE SINGLE STRAND, RED FOR TURF ZONES AND ORANGE FOR LANDSCAPE, ALL COMMON WIRE SHALL BE #14 GAUGE SINGLE STRAND WHITE AND ALL SPARE WIRES, TWO (2) WIRES INSTALLED TO THE FURTHEST POINTS OF THE SYSTEM, SHALL BE #14 GAUGE SINGLE STRAND BLUE.
6. QUICK COUPLING VALVES SHALL BE INSTALLED ON 1 INCH PVC SWING JOINTS WITH BRASS INSERTS AND STABILIZERS. (SEE DETAIL)
7. ALL SPRAY SPRINKLERS SHALL BE INSTALLED ON SWING PIPE ASSEMBLIES, MIN. LENGTH TO BE 6 INCHES, 18 INCH MAXIMUM.
8. SMALL GEAR DRIVE ROTARY SPRINKLERS SHALL BE INSTALLED ON 3/4-INCH PVC SWING JOINTS.
9. IRRIGATION SYSTEM IS DESIGNED FOR SEPARATE WATER SUPPLY TO PROVIDE 85 GPM MAX FROM NEW 3-INCH SERVICE. SYSTEM TO PRODUCE 70-PSI DYNAMIC PRESSURE AT IRRIGATION CONTRACTOR'S POINT OF CONNECTION IN LANDSCAPED AREA OUTSIDE OF THE BUILDING.
10. CONTRACTOR SHALL TEST DYNAMIC PRESSURE BEFORE STARTING WORK, REPORT ANY DEVIATION FROM PRESSURE REQUIRED TO OWNER'S REP. BEFORE CONTINUING.
11. INSTALL CONTROLLER IN MECHANICAL ROOM AS DIRECTED BY OWNER'S REP., HARD WIRE TO 120 VOLT, DEDICATED 20 AMP CIRCUIT. BUILDING POWER SUPPLY USING LICENSED ELECTRICIAN. ROUTE ALL ZONE AND SPARE WIRES TO CONTROLLER VIA 2 INCH CONDUIT.
12. IRRIGATION FLOW METER AND MASTER VALVE SHALL BE PROVIDED BY THE IRRIGATION CONTRACTOR AND INSTALLED BY THE PLUMBING CONTRACTOR.
13. CONTRACTOR SHALL HARDWIRE IRRIGATION CONTROLLER REMOTE COMMUNICATION MODULE TO TELEPHONE CABLE PROVIDED BY OTHERS TO THE MECHANICAL ROOM.
14. INSTALL RAIN SENSOR ON BUILDING ROOF WHERE DIRECTED BY OWNER'S REP., RAIN SENSOR WIRING SHALL BE CONTAINED IN 1/2 INCH PVC CONDUIT, ROUTED WITHIN THE BUILDING. SEE MECHANICAL/ELECTRICAL/PLUMBING PLANS FOR CONDUIT ROUTING.
15. ALL ABOVE GROUND WIRING, INSIDE AND OUTSIDE OF BUILDING, SHALL BE INSTALLED IN RIGID, METALLIC CONDUIT FOR VANDALISM PROTECTION.
16. COORDINATE LOCATION OF ALL EXISTING AND FUTURE UTILITIES ON SITE AND CONTACT PROPER AUTHORITIES AND UTILITY COMPANIES BEFORE THE START OF WORK.
17. FLUSH ALL LATERAL LINES BEFORE INSTALLING IN-LINE DRIP TUBING OR SPRINKLERS.
18. SPRAY SPRINKLERS FOR TURF SHALL HAVE 6 INCH POP UP HEIGHT. SPRAY SPRINKLERS FOR LANDSCAPE PLANTINGS AND GROUND COVER SHALL HAVE 12 INCH POP UP HEIGHT.
19. CONTRACTOR MUST SUBMIT SHOP DRAWINGS AS PER THE WRITTEN SPECIFICATIONS TO THE IRRIGATION CONSULTANT FOR APPROVAL PRIOR TO ORDERING MATERIAL AND BEGINNING WORK.
20. ANY AND ALL MATERIAL SUBSTITUTIONS WHICH VARY FROM THE SPECIFIED PRODUCTS MUST BE SUBMITTED TO THE IRRIGATION CONSULTANT FOR APPROVAL AS PART OF THE SUBMITTAL PROCESS.
21. ONCE APPROVED SUBMITTALS HAVE BEEN RETURNED TO THE CONTRACTOR, WORK MAY BEGIN. THE IRRIGATION CONSULTANT MUST BE NOTIFIED A MINIMUM OF 7-DAYS IN ADVANCE OF THE START OF WORK TO COORDINATE ON-SITE SUPERVISION AND ADMINISTRATION.

LATERAL PIPE SCHEDULE	
FLOW	PIPE SIZE / TYPE
0-12 GPM	1 INCH 100 PSI POLYETHYLENE OR CLASS-200 PVC
12-22 GPM	1-1/4 INCH 100 PSI POLYETHYLENE OR CLASS-200 PVC
23-35 GPM	1-1/2 INCH CLASS-200 PVC
36-55 GPM	2 INCH CLASS-200 PVC
55+ GPM	2-1/2 INCH CLASS-200 PVC


NOTES:
1. ALL PIPING MUST BE HUNG FROM GARAGE ROOF. HANGER SUPPORT ROD MUST BE A MINIMUM OF 3/8-INCH IN DIAMETER. MECHANICAL AND ELECTRICAL PIPES REQUIRE HANGERS EVERY FIVE FEET AND HANGERS ON EACH SIDE OF BRANCH CONNECTIONS. USE CONCRETE ANCHORS WHERE NECESSARY TO SECURE PIPE HANGERS TO GARAGE ROOF.
2. ALL MECHANICAL AND ELECTRICAL PIPING WILL EXTEND FIVE FEET ABOVE THE TOP OF THE GARAGE ROOF.
3. CONTRACTOR SHALL DRILL PENETRATIONS THROUGH THE BASE OF THE PLANTERS TO ACCOMMODATE THE MECHANICAL AND ELECTRICAL PIPE SLEEVES. CONTRACTOR SHALL BE RESPONSIBLE FOR WATERPROOFING ALL PENETRATIONS AND ROUTING COPPER PIPE THROUGH PLANTER LINERS AND FILL MATERIALS WHILE MAINTAINING THE INTENT OF THE LANDSCAPE ARCHITECTS' PLANTERS DESIGNS.
IRRIGATION POINT OF CONNECTION AND CONTROLLER LOCATIONS YET TO BE DETERMINED.
WINTERIZATION POINT OF CONNECTION WITH GARAGE.
INSTALL RAIN SENSOR AT TOP OF BENCH ON PLANTER SIDE. PENETRATE GARAGE ROOF FROM BELOW AND BRING 1/2-INCH SCHEDULE 40 PVC RIGID ELECTRICAL CONDUIT TO RAIN SENSOR FROM CONTROLLER WITH TWO DEDICATED #14 SINGLE STRAND, TYPE UF COPPER WIRES RUN THROUGH FROM CONTROLLER TO RAIN SENSOR. SENSOR SHALL BE INSTALLED IN A SENSOR GUARD MOUNTED TO THE BACK OF THE BENCH ON THE PLANTER SIDE.
A1 9.55 1"
A2 1.12 1"
A3 1.50 1"
A4 3.84 1"
A5 0.285 1"
A6 0.355 1"
BRING TYPE K 1-1/2-INCH COPPER PIPE AND 1-1/2-INCH SCH. 40 PVC ELECTRICAL CONDUIT UP FROM GARAGE BELOW. PENETRATE CEILING AND SEAL PENETRATIONS WITH WATERTIGHT LINK SEALS.
BRING TYPE K 1-INCH COPPER UP FROM GARAGE BELOW. PENETRATE CEILING AND SEAL PENETRATION WITH WATERTIGHT LINK SEAL.
INSTALL TWO SPARE WIRES FROM CONTROLLER TO THIS LOCATION, COIL NEATLY LEAVING THREE FEET OF SLACK AND WATERPROOF. INSTALL IN 6-INCH VALVE BOX.
BRING TYPE K 1-INCH COPPER UP FROM GARAGE BELOW. PENETRATE CEILING AND SEAL PENETRATION WITH WATERTIGHT LINK SEAL.
BRING TYPE K 1-INCH COPPER PIPE DOWN FROM PLANTER TO GARAGE BELOW. PENETRATE CEILING AND SEAL PENETRATION WITH WATERTIGHT LINK SEAL.
BRING TYPE K 1-INCH COPPER UP FROM GARAGE BELOW. PENETRATE CEILING AND SEAL PENETRATION WITH WATERTIGHT LINK SEAL. AT BRANCH BELOW IN GARAGE PROCEED WITH 1-INCH TYKE K COPPER TO NEXT PLANTER.
BRING 1-INCH TYPE K COPPER PIPE DOWN FROM PLANTER TO GARAGE BELOW. PENETRATE CEILING AND SEAL PENETRATION WITH WATERTIGHT LINK SEAL.
BRING TYPE K 1-1/2-INCH COPPER PIPE AND 1-1/2-INCH SCH. 40 PVC ELECTRICAL CONDUIT UP FROM GARAGE BELOW. PENETRATE CEILING AND SEAL PENETRATIONS WITH WATERTIGHT LINK SEALS. AT PIPE BRANCHES BELOW PROCEED TO NEXT PLANTER WITH 1-1/2-INCH TYPE K COPPER AND 1-1/2-INCH SCH. 40 PVC ELECTRICAL CONDUIT.
BRING TYPE K 1-1/2-INCH COPPER PIPE AND 1-1/2-INCH SCH. 40 PVC ELECTRICAL CONDUIT UP FROM GARAGE BELOW. PENETRATE CEILING AND SEAL PENETRATIONS WITH WATERTIGHT LINK SEALS. AT PIPE BRANCHES BELOW PROCEED TO NEXT PLANTER WITH 1-1/2-INCH TYPE K COPPER AND 1-1/2-INCH SCH.. 40 PVC ELECTRICAL CONDUIT.
BRING TYPE K 1-1/2-INCH COPPER PIPE AND 1-1/2-INCH SCH. 40 PVC ELECTRICAL CONDUIT UP FROM GARAGE BELOW. PENETRATE CEILING AND SEAL PENETRATIONS WITH WATERTIGHT LINK SEALS.
INSTALL ONE SPARE WIRE FROM CONTROLLER TO THIS LOCATION, COIL NEATLY LEAVING THREE FEET OF SLACK AND WATERPROOF. INSTALL IN 6-INCH VALVE BOX.
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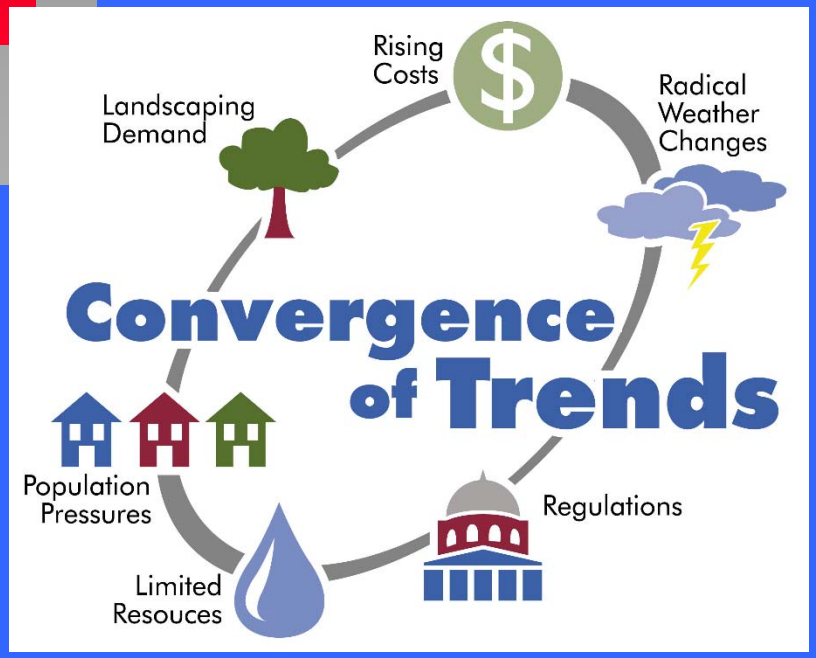
BRING TYPE K 1-INCH COPPER UP FROM GARAGE BELOW. PENETRATE CEILING AND SEAL PENETRATION WITH WATERTIGHT LINK SEAL.

SCALE 1"= 10FT.

ALTERNATIVE WATER SOURCES

THE TREND



- *Due to many factors, using potable water for irrigation systems is no longer the "acceptable" practice.*
- *The days of using potable water for irrigation are numbered.*

ALTERNATIVE SOURCES

- *Why should an alternative irrigation water source be considered?*
  - *Limited Resource*
  - *Sustainability*
  - *Regulation*
  - *LEED*
  - *Water Cost*

IRRIGATION SOURCES

- Potable:
  - Municipal
  - Groundwater
  - Surface Water
- Alternative:
  - Rainwater
  - Storm Water
  - Treated Effluent (X)
  - Condensate
  - Grey Water (X)
- Processed:
  - Recycled (Reuse)
  - Reverse Osmosis
  - Desalination
  - Reject Water

STORM WATER

- Storage Basins
  - Detains the Water
  - Retains the Water
- Water Quality
  - Source
  - Filtering
  - Undesirables
    - Oil
    - Sand
    - Trash
  - Disinfection required in New York if overhead

RAIN WATER COLLECTION

- *90% of the roof water is usually collectible*
- *Need to maximize the collection area*
- *Need to minimize contaminants.*

RAIN WATER COLLECTION

- *Filtering will be required, possibly at multiple points.*
- *One storage location/container or several may be required to maximize collection.*
- *Economics and efficiencies are important design criteria in relation to the number of tanks, pumps, etc.*
- *What if it doesn't rain?*

RECYCLED-REUSE SOURCES

- *PROS*
  - *Cost*
  - *Quantity*
- *CONS*
  - *Quality*
  - *Quantity*
  - *Regulation*

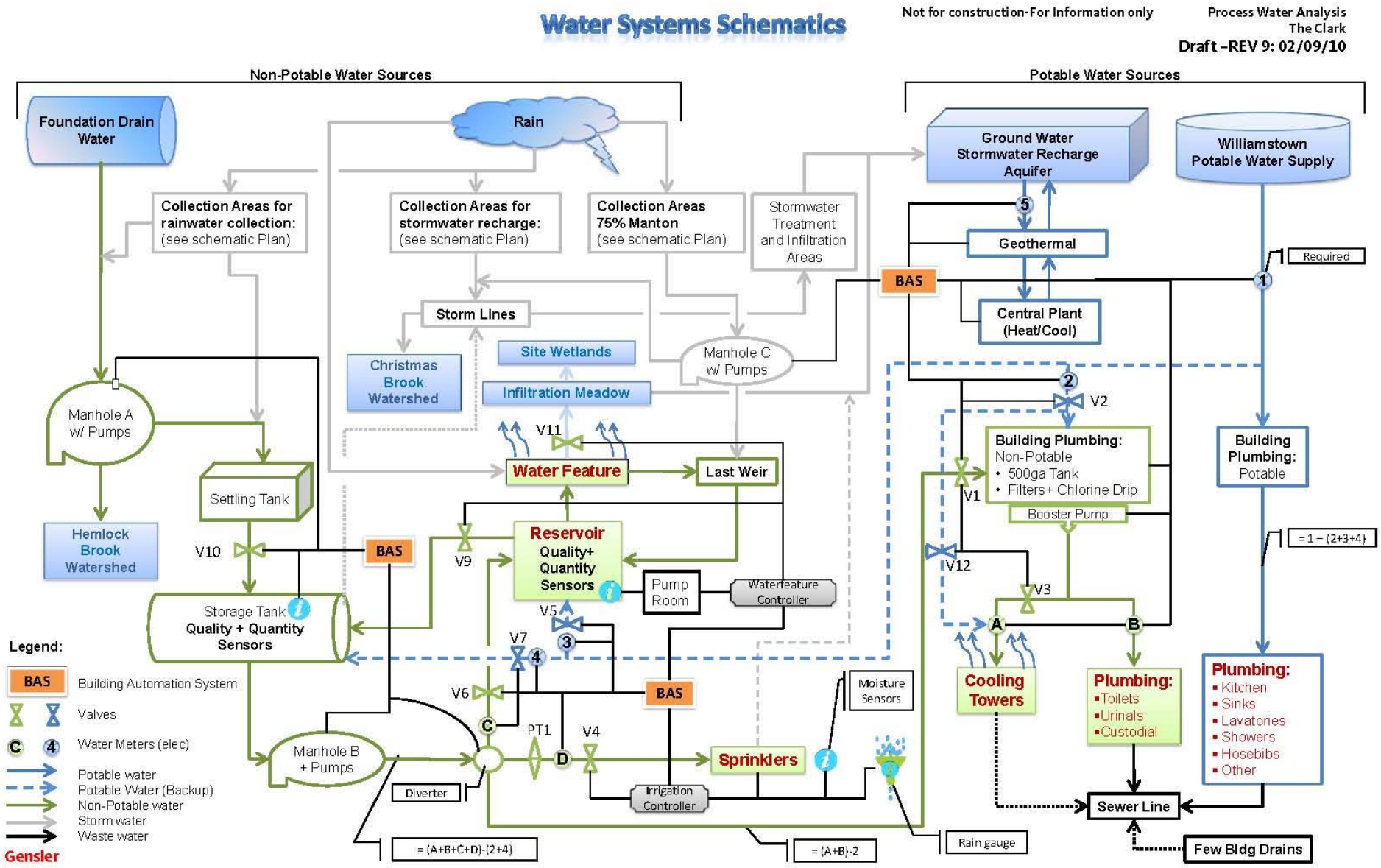
GREY WATER

- *Allowed*
  - *Clothes Washers*
  - *Bathtub/Shower*
  - *Sinks*
- *Prohibited*
  - *Kitchen Sink*
  - *Dishwasher*
  - *Toilets*
- *At least 13 states have grey water policies.*
- *Most likely will need a permit.*

MIXING ALTERNATIVES

- While One Source Alone May Not Be Sustainable for Irrigation, Multiple Sources Could Be
- Mixing Alternatives (within Storage Facility) Can Mitigate Risk of Landscape Loss
- Combining Sources Improves Quantity and Quality (Dilution, Temperature Reduction)

COMPLEXITY


Water Systems Schematics
Not for construction-For Information only
Process Water Analysis
The Clark
Draft –REV 9: 02/09/10
Non-Potable Water Sources
Potable Water Sources
Foundation Drain Water
Rain
Collection Areas for rainwater collection: (see schematic Plan)
Collection Areas for stormwater recharge: (see schematic Plan)
Collection Areas 75% Manton (see schematic Plan)
Stormwater Treatment and Infiltration Areas
Ground Water Stormwater Recharge Aquifer
Williamstown Potable Water Supply
Geothermal
Central Plant (Heat/Cool)
BAS
Required
Storm Lines
Site Wetlands
Infiltration Meadow
Christmas Brook Watershed
Manhole C w/ Pumps
Manhole A w/ Pumps
Settling Tank
Hemlock Brook Watershed
V10
V11
V2
V1
V9
V12
V3
V5
V7
V6
V4
PT1
Water Feature
Last Weir
Reservoir
Quality+ Quantity Sensors
Pump Room
Waterfeature Controller
Storage Tank
Quality + Quantity Sensors
Building Plumbing: Non-Potable
• 500ga Tank
• Filters+ Chlorine Drip
Booster Pump
Building Plumbing: Potable
= 1 – (2+3+4)
Cooling Towers
Plumbing:
▪ Toilets
▪ Urinals
▪ Custodial
Plumbing:
▪ Kitchen
▪ Sinks
▪ Lavatories
▪ Showers
▪ Hosebibs
▪ Other
Moisture Sensors
Sprinklers
Irrigation Controller
Manhole B + Pumps
Diverter
Rain gauge
Sewer Line
Few Bldg Drains
= (A+B+C+D)-(2+4)
= (A+B)-2
Legend:
Building Automation System
Valves
Water Meters (elec)
Potable water
Potable Water (Backup)
Non-Potable water
Storm water
Waste water
Gensler

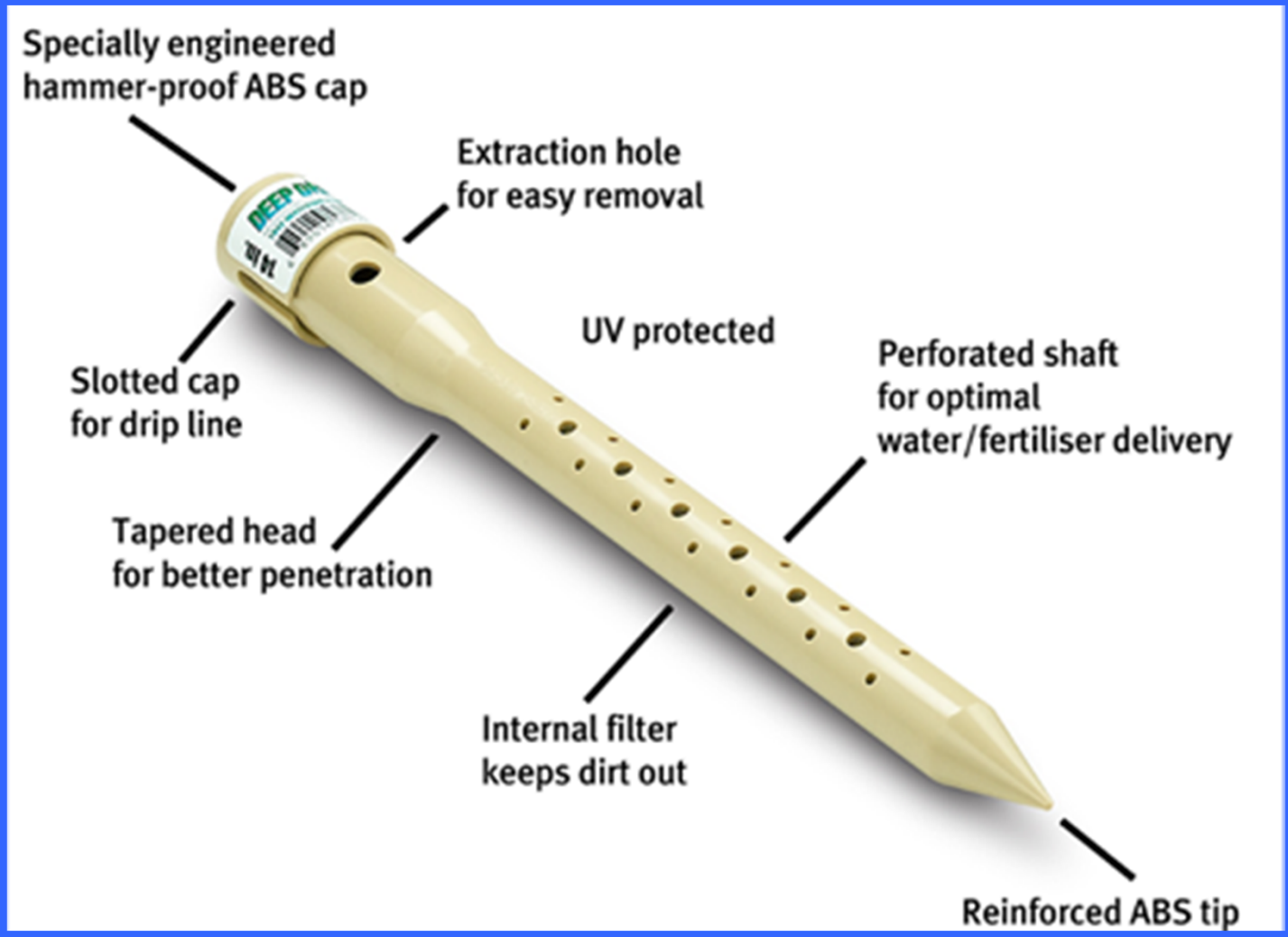
URBAN TREES

- *Typically tree irrigation has been done with spray sprinklers or bubblers which use large amounts of water.*
- *Drip rings have also been used.*

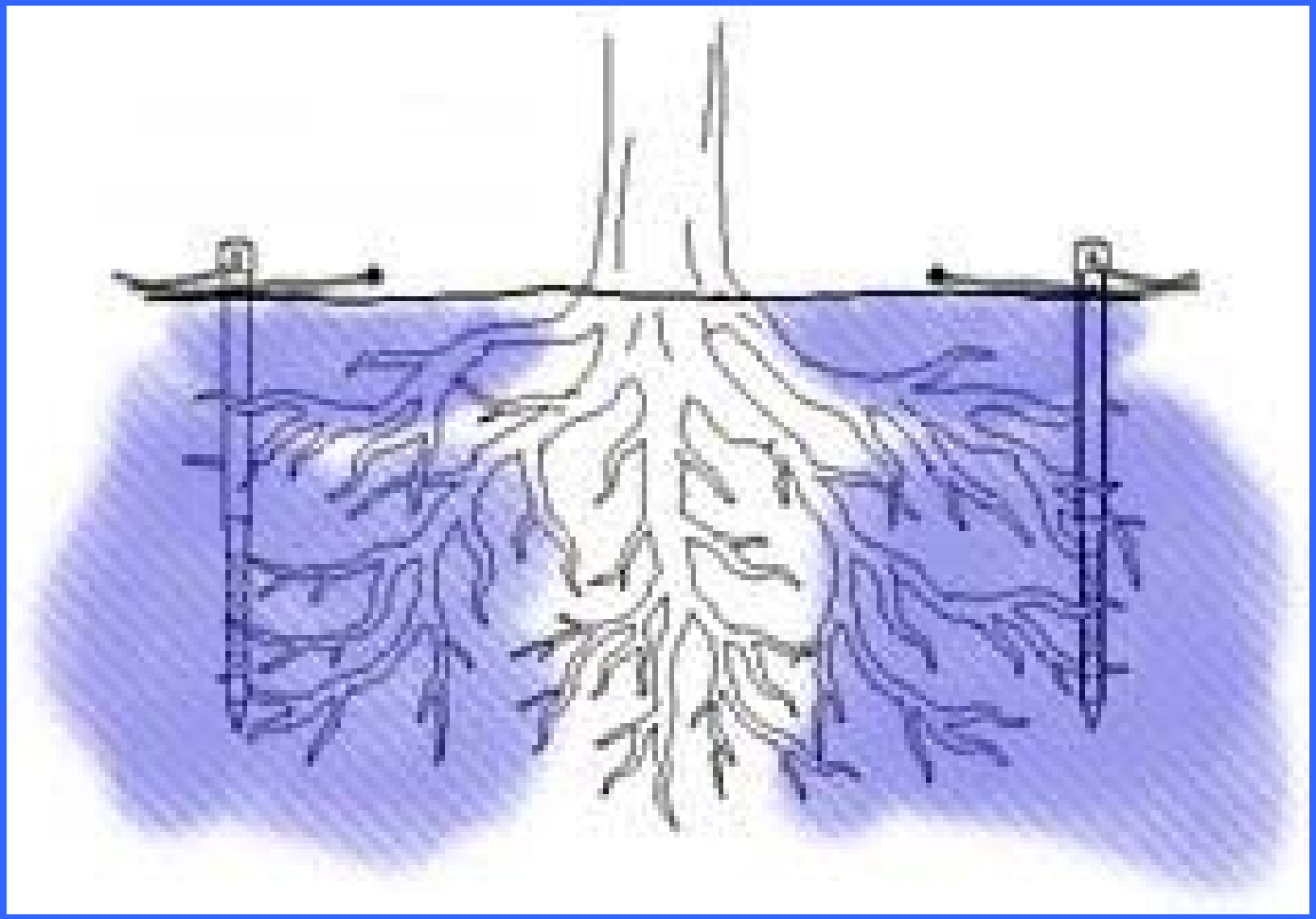
URBAN TREES

- *Newer technologies include drip stakes which do a better job of applying water directly to the root ball at lower application rates.*

DRIP STAKES

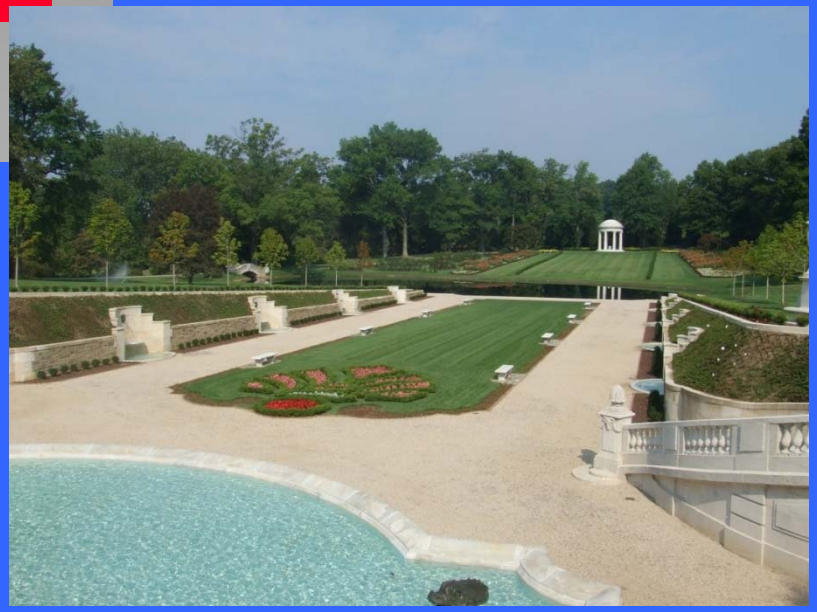

Specially engineered
hammer-proof ABS cap
Extraction hole
for easy removal
UV protected
Slotted cap
for drip line
Perforated shaft
for optimal
water/fertiliser delivery
Tapered head
for better penetration
Internal filter
keeps dirt out
Reinforced ABS tip

DRIP STAKES



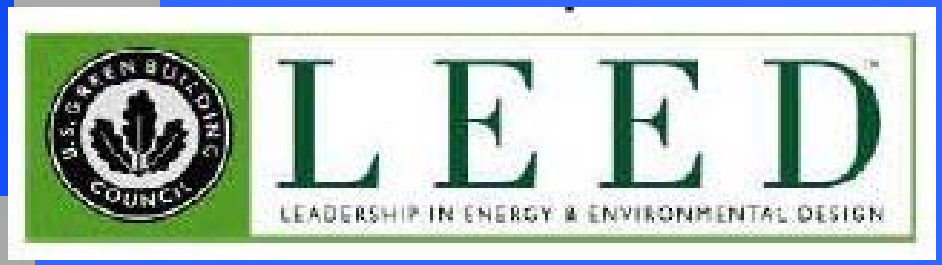
Water applied directly into the root ball at greater depth

GOING GREEN



- *Green and sustainable systems are required to use significantly less potable water or alternative sources of water.*

LEED CONSIDERATIONS



- *Emphasis is on water efficiency and removal of potable water from irrigation systems.*
- *LEED describes high efficiency irrigation technologies as micro irrigation, moisture sensors or climate-based controllers.*

WHAT AFFECTS LEED IRRIGATION POINTS?

- *Water Efficiency*
  - *Amount of Turf*
  - *Sprinkler Equipment*
    - *Pressure Regulation*
    - *Drip Irrigation*
  - *Controller Type*
    - *Rain Sensor*
    - *Climate Based*
    - *Soil Moisture*
- *Alternative Water Supplied*

STANDARDS


ASTM
INTERNATIONAL


NIST
National Institute of
Standards and Technology


ANSI
American National Standards Institute


ASABE


ISO
International
Organization for
Standardization


ICC
INTERNATIONAL
CODE COUNCIL
People Helping People Build a Safer World™

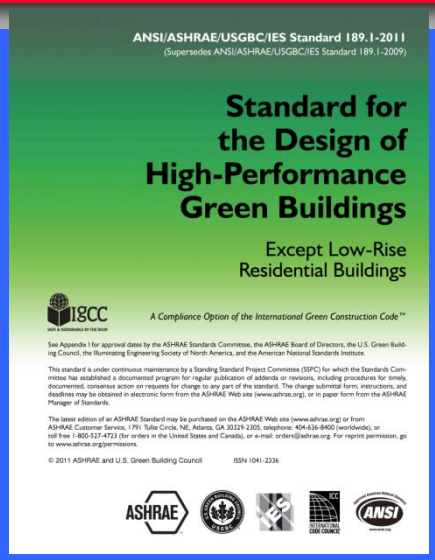

ASPE

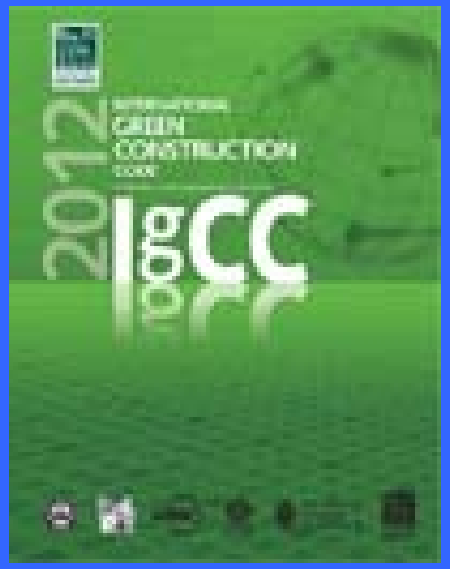

IAPMO
STANDARDS

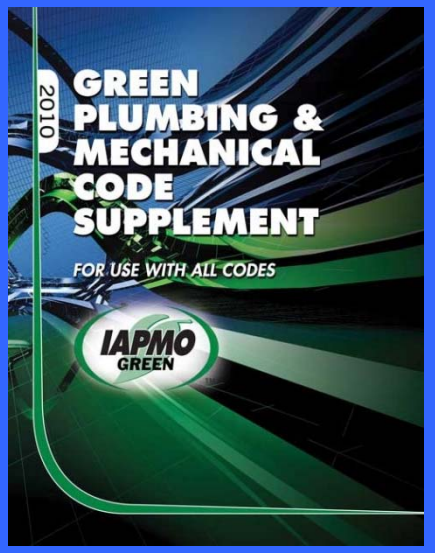

ASHRAE
Advancing HVAC&R to serve humanity
and promote a sustainable world

STANDARDS AND CODES

- *Limit runoff by limiting precipitation rate.*
- *Require use of alternative water sources.*
- *Water quality is a concern.*
- *Require recognized competency through certification, etc.*
- *Limited turf areas*
- *Metering*
- *Inconsistent from code to code*







OTHER PROGRAMS

WATER USE

- Based on Area and Plant Material
  - Turf
  - Plantings
  - Trees
  - SBSS
- EPA Water Budget Tool
  - July
- Actual Design
  - Sprinklers
  - Zones

WaterSense New Home Specification: Water Budget Tool (V 1.02)

This water budget tool shall be used to determine if the designed landscape meets Criteria 4.1.1 of the specification.
Please refer to the WaterSense Water Budget Approach for additional information.

Your Name:	Guy Bou Lahdou
Builder Name:	
Lot Number/Street Address:	
City, State, Zip Code:	
Peak Watering Month:	July
Is an irrigation system being installed on this site?	Yes

EPA WaterSense

This worksheet determines if the designed landscape meets the water budget.

If the landscape water requirement is LESS than the landscape water allowance, then the water budget criterion is met.
If the landscape water requirement is GREATER than the landscape water allowance, then the landscape and/or irrigation system needs to be redesigned to use less wate

STEP 3A - REVIEW THE LWA AND LWR FROM PART 1 AND PART 2

LWA 19,023 (gallons/month) LWR 7,058 (gallons/month)

STEP 3B - REVIEW THE TOTAL AREA OF TURFGRASS* IN THE DESIGNED LANDSCAPE FROM STEP 2B

The designed landscape contains 0 square feet of turfgrass.* This is 0% of the landscaped area.

*This includes the area of any pools, spas, and/or water features, designated by WaterSense to be counted as turfgrass.

OUTPUT - DOES THE DESIGNED LANDSCAPE MEET THE WATER BUDGET?

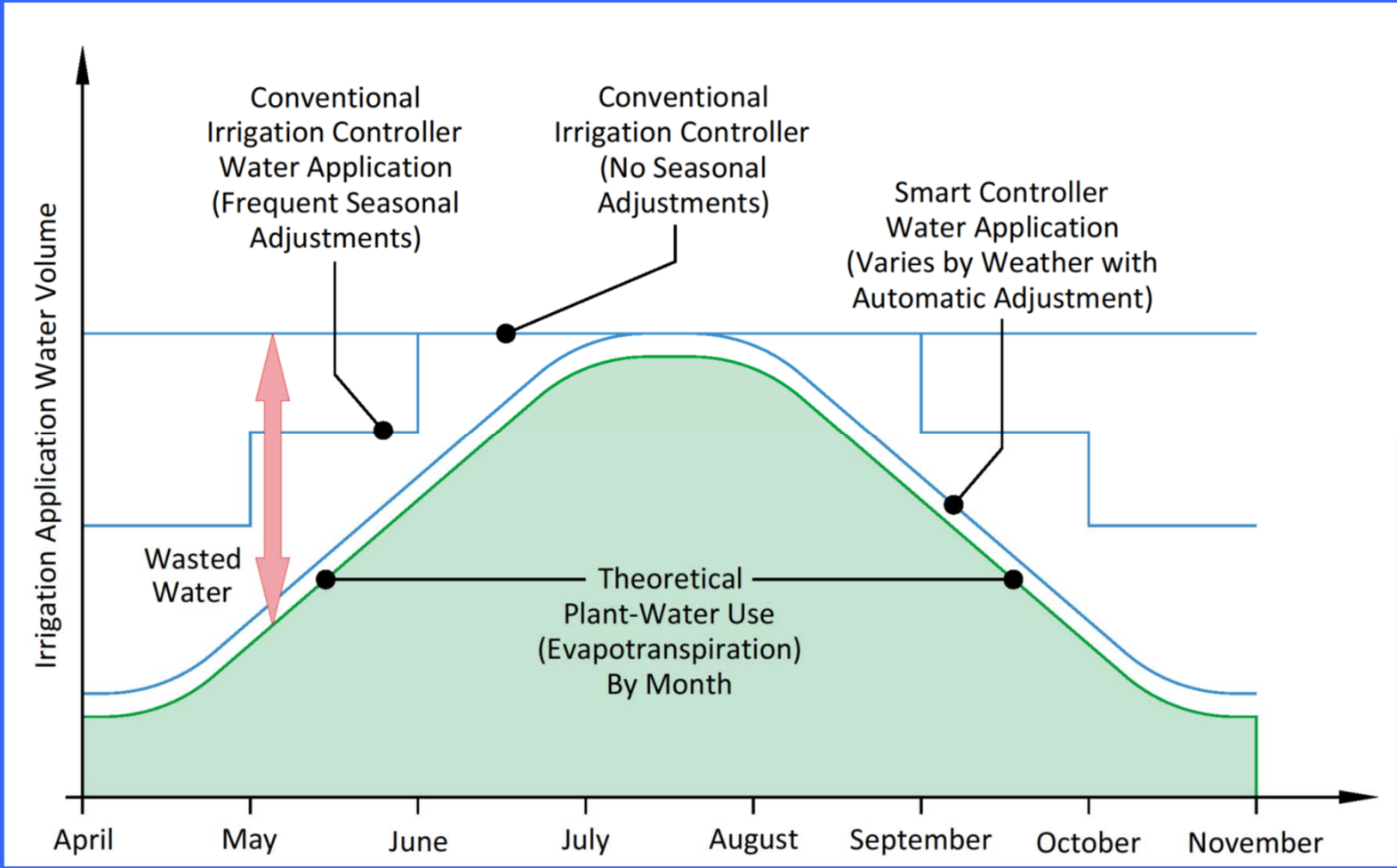
YES If YES, then the water budget criterion is met.
If NO, then the landscape and/or irrigation system needs to be redesigned to use less water.

The designed landscape water requirement is a 74% reduction in water use from the baseline calculated in Part 1.

IRRIGATION MANAGEMENT AND TECHNOLOGY

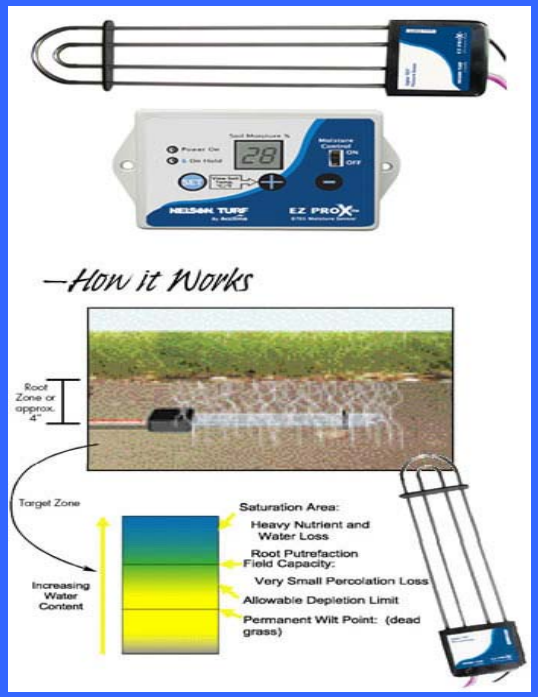
SET IT AND FORGET IT

Irrigation Systems are only as Smart as their Managers



TECHNOLOGY

- *Smart Controllers*
  - *Weather based and soil moisture based.*



"SMART" CONTROLLERS

- *Eliminates arbitrary zone times (human intervention).*
- *Installer performs a simple (?) audit by zone of sprinkler type, plant type, soil type, etc.*
- *Weather or soil moisture based, not time based watering.*
- *EPA WaterSense labeled smart controllers.*

SOIL MOISTURE SENSORS

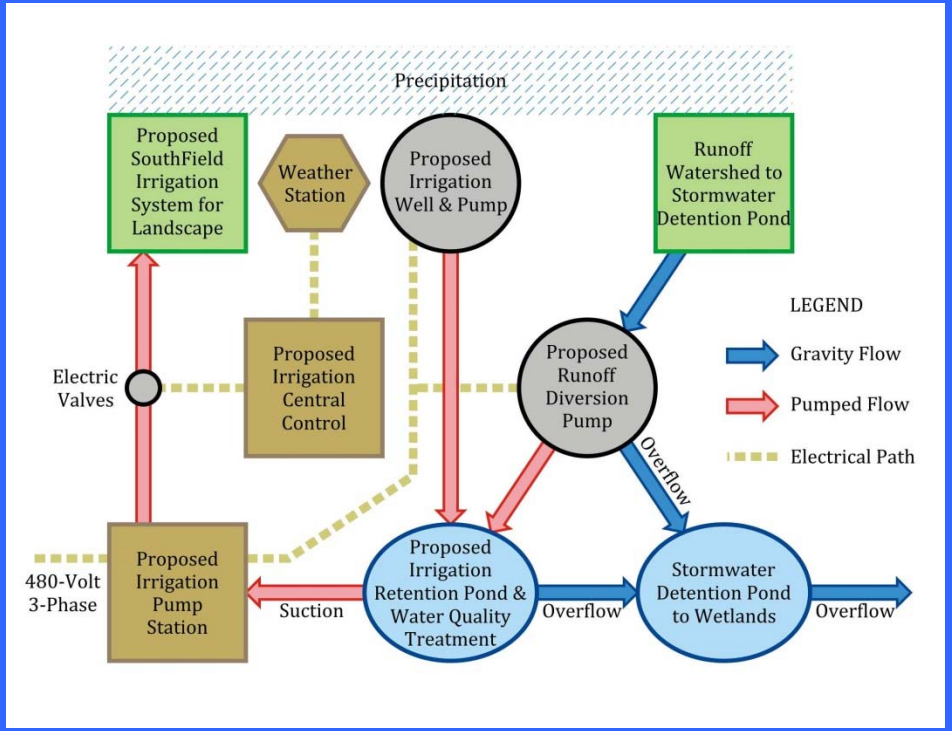
- *Safety*
  - *Off Switch*
  - *Adjustable Moisture Level*
- *Monitor and Tracking*
  - *Keep a Level of Moisture*
  - *Allow Irrigation at a Set Level of Moisture*
- *With Controller*
- *Add on to Controller*
- *Requires Calibration*
- *Education Lacking*

APPS

- *Internet Based Scheduling*
- *Smart Device*
- *Flow Sensing*
  - *Tracks Water Use*
  - *Leak Detection*
- *Rain Scheduling*
- *Now 100+*
  - *Good Technology*
  - *Poor Scheduling*

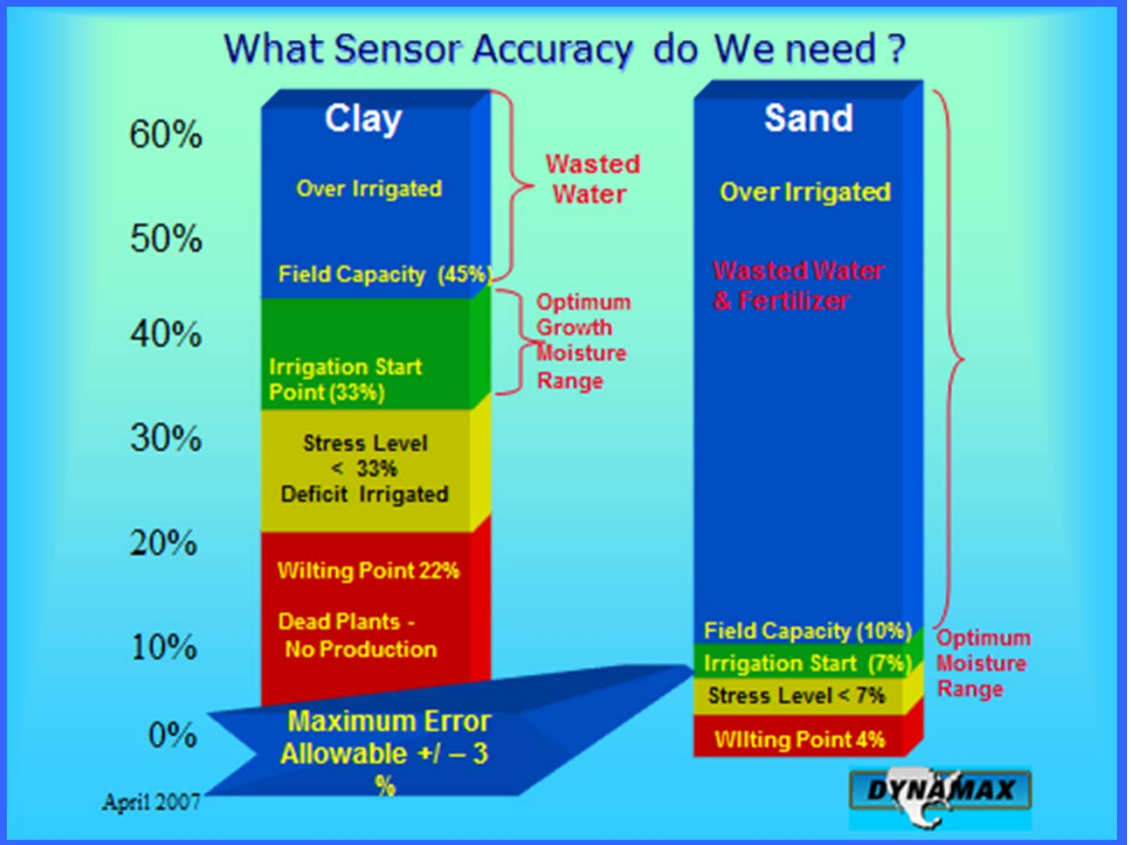
WHAT TALKS TO WHAT?

- *The more you want to talk to:*
  - *The more sophisticated the system becomes*
  - *The smarter (logic) the system needs to be*
  - *The more equipment there is*
  - *The higher the cost*



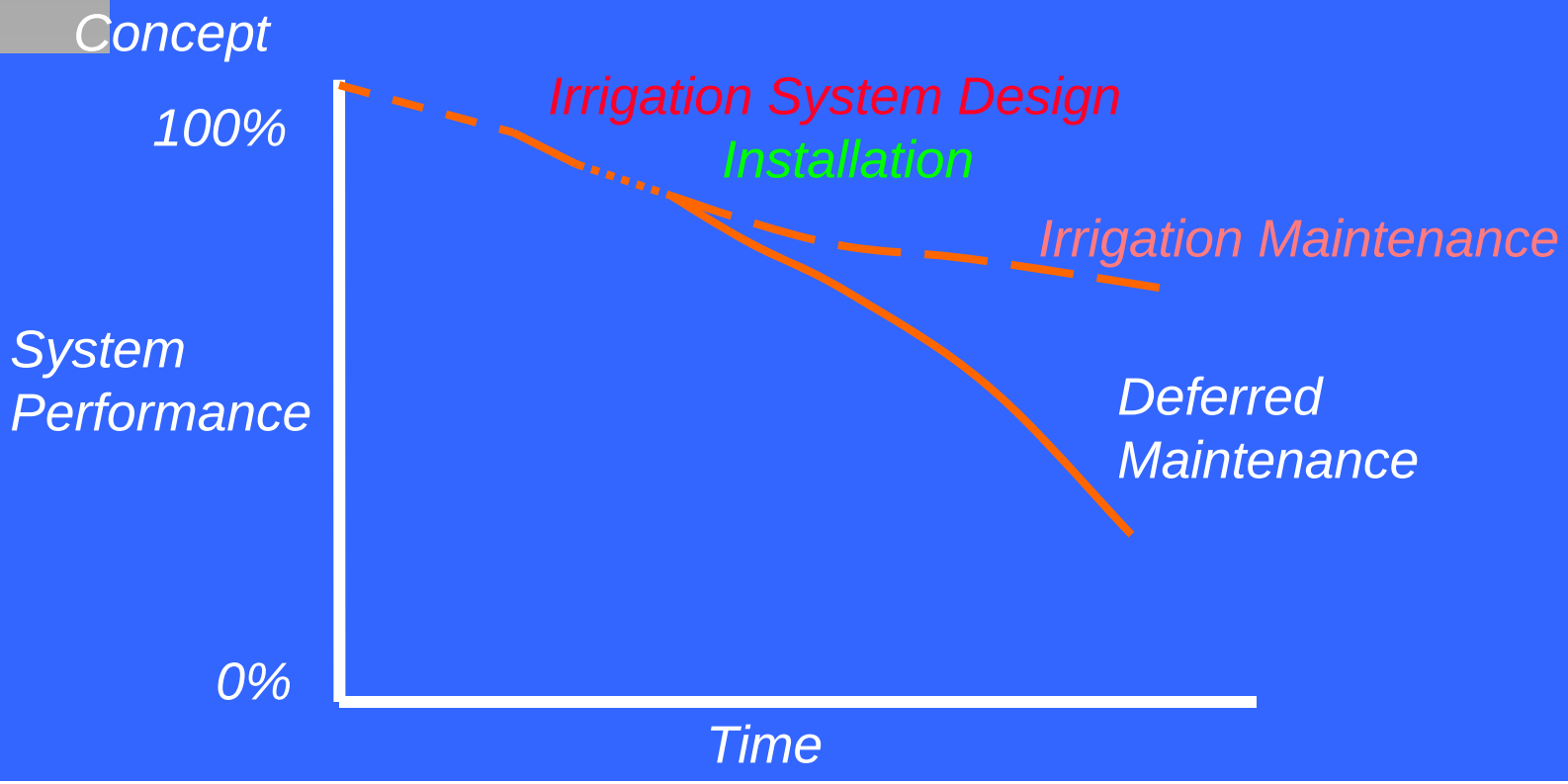
WHAT TALKS TO WHAT?

- Controller to Soil Moisture Sensor(s)
  - How Interactive?
    - Control
    - Safety
  - Compatibility
    - Manufacturer
    - Signal Protocol
  - Communication Cable
    - Conventional
    - Two-Wire



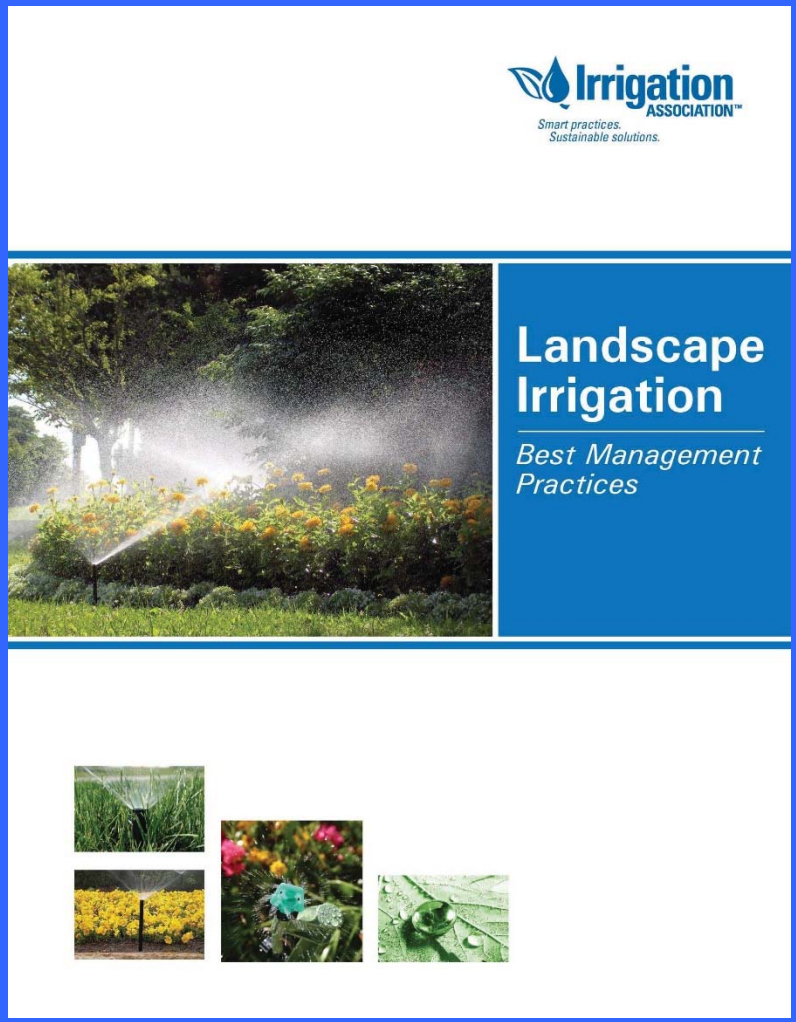
MAINTENANCE

- The single most critical element to long-term resource conservation



BMP's

- *Developed in 2014 by the IA and ASIC.*
- *Provides an outline on how landscape irrigation systems should be designed, managed and installed.*



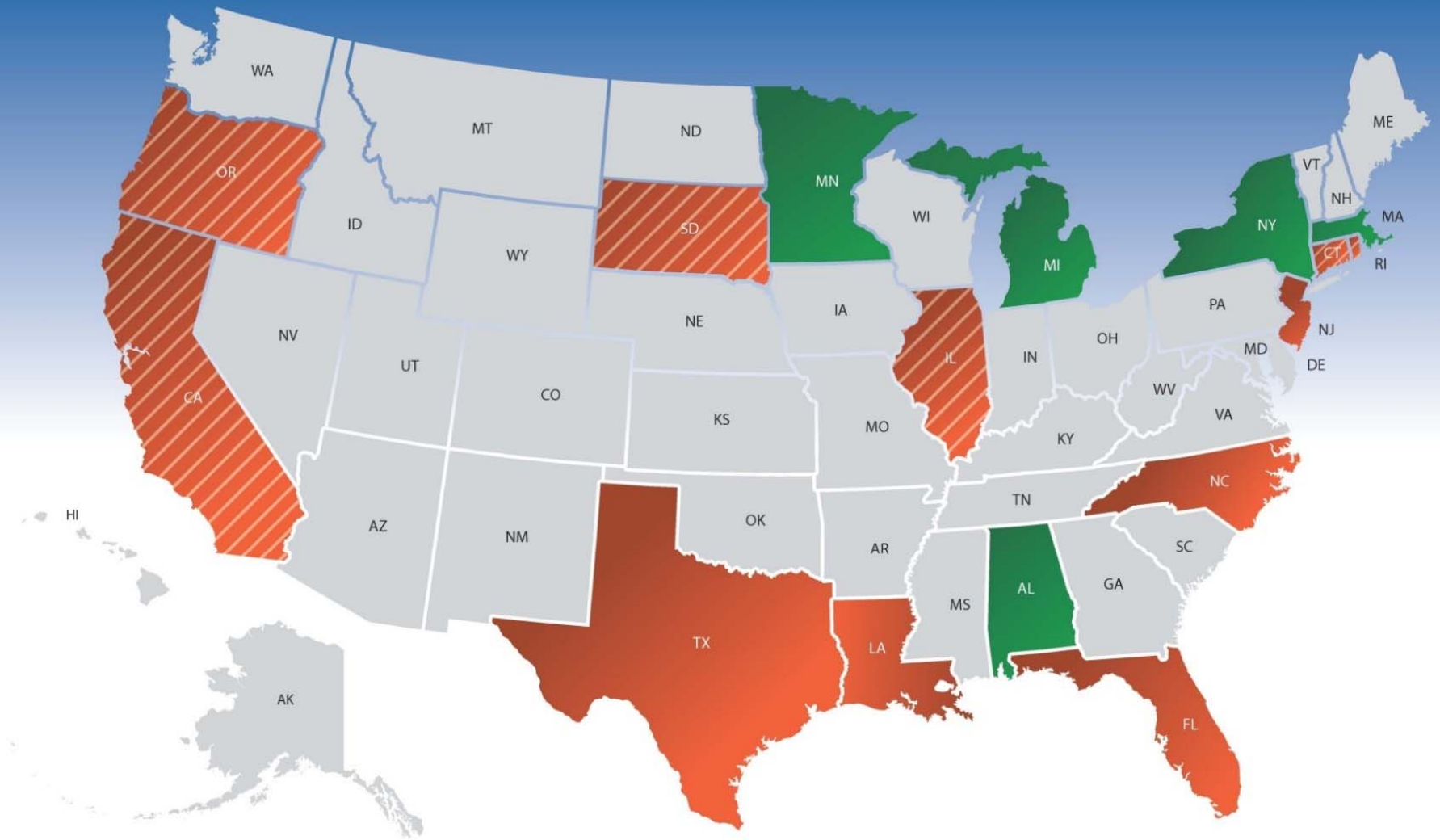
LEGISLATION

- Rain Shutoff
  - Incorporate in water conservation guidelines

CERTIFICATION/LICENSING

- Contractor
- Designer
- Auditor
- Demonstrates a level of knowledge

IRRIGATION CONTRACTOR LICENSING IN THE UNITED STATES



NOT JUST IRRIGATION

- *Saving water in the landscape and being sustainable does not just involve irrigation.*
- *Native Plants*
- *Soil Type and Depth (6 inches?)*
- *Landscape Management*

QUESTIONS

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www.irrigationconsulting.com